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at Geisenheim on the Rhine, has gone over the same ground in a long series of experiments (Ist die Transpirationsgrösse der Pflanzen ein Maassstab für ihre Anbaufähigkeit? *Landw. Jahrb.*, Bd. 24, 1895, H. 3, pp. 503–537) which throw doubt on Müller-Thurgau's methods and lead to the following opposite conclusions: (1) In determining the amount of transpiration the entire decrease in weight of the plant and apparatus must be taken into account and not simply the decrease of water in the flasks, since under pressure, in short experiments, the error resulting from the forcing into the wood of water which is not transpired is very considerable. (2) The demonstrated transpiration of any branch can *never* be taken as a measure of the transpiration of the whole tree. (3) The amount of transpiration of different branches of the same tree may be wider apart in many cases than that of branches of different trees or even of different varieties. (4) In parallel experiments, under exactly the same transpiration conditions, the ratio of the amount of water given off by different branches is by no means constant. (5) The influence and interchange of the different factors governing transpiration is quite different in different individuals. (6) The present condition of the individual and the circumstances under which it previously transpired have a great influence upon transpiration. (7) It follows that the amount of transpiration of a single individual cannot be regarded as a measure of the water requirements of the whole variety. According to the writer, Müller-Thurgau has also left out of account the capacity of individuals and varieties to adapt themselves to changed conditions.—ERWIN F. SMITH.

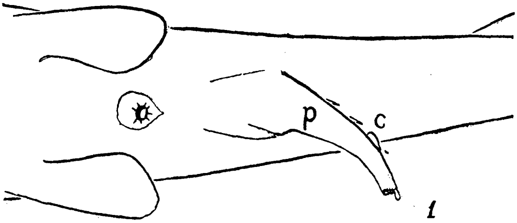
ZOOLOGY.

A Stratified Lake Fauna.—One of the most interesting results achieved by the naturalists of the Russian Biological Station on the island of Solowetzk in the North Sea, has been the discovery of a remarkable lake on the island of Kildine in the Arctic Ocean. This lake, which is completely separated from the sea by a narrow strip of land, was discovered by the Russian naturalist, M. H. Herzenstein, who was struck by finding in the lake a fish which is exclusively marine in habit, namely, the common cod. Further observations by MM. Faussek and Knipowitsch have elucidated the peculiar features of the fauna of the lake. On the surface the water is fresh, and is inhabited by fresh water animals, such as Daphnids, etc.; this water is brought to the lake by streams from a neighboring marsh. Under the superficial layer of fresh water is found salt water, supporting a Marine fauna—Sponges, Sea-anemones, Nemertines, Polychætes, marine Molluscs, Starfish and Pantopods. There is even a regular littoral zone beneath the fresh water, characterized by small Fuci.

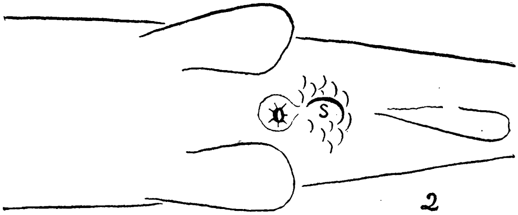
The bottom of this lake is covered with mud exhaling an odor of sulphurretted hydrogen, and is not inhabited. The water of the lake shows a slight ebb and flow, attaining a vertical height of only a few inches, while the tides in the adjacent sea are considerably greater. This fact would appear to point to the existence of some subterranean communication between the lake and the sea. (Nature, July, 1895.)

Sexual Rights and Lefts.—The genus Anableps includes several species of the most extraordinary of the fishes. With other novel characters, they have the eye divided into a lower section, looking downward, and an upper protruded above the head conveniently for seeing on the surface of the water; the pelvis also is divided; and the young are retained in the ovary until well developed. Our present, interest, however, concerns only their means of fertilization. In a study of the Cyprinodonts (Monograph published as Vol. XIX, No. 1, of the Memoirs of the Museum of Comparative Zoology, from which this item is repeated) particular examinations of the anal fin of the males, which is modified into an intromittent organ, disclosed the fact that its structure adapts it for sidewise motion, rather than vertical. Directing attention to the species *A. anableps* of Linné (*A. tetrophthalmus* of others), comparisons of the males showed that this organ differs in individuals, being functionally dextral on about three-fifths, and sinistral on about two-fifths of the specimens. Among the females in the Museum's collection a similar state of affairs exists, but with the numbers reversed, two-fifths of them being rights and three-fifths lefts. Once possessed of the facts, dextrals and sinistrals are easily recognized. Happily Professor Agassiz, on his Brazilian Expedition, had provided a considerable amount of material to compare.

Of the accompanying diagrams, figure 1 represents the lower side of the hinder portion of a dextral male, figure 2 that of a sinistral female, figure 3 that of a dextral female, and figure 4 that of a sinistral male. In its posterior half the anal fin of the male (*p*), the sexual organ, is bent to the right on dextrals (1), or to the left on sinistrals (4); it has on the convex side of the bend a small fleshy tubercle or gland (*c*), while the urogenital tube lies along the concave side. The opening to the oviducts of the female, behind the vent, is covered by a larger scale (*s*), a foricula (a diminutive shutter), which opens to the right on dextral (3) and to the left on sinistral individuals (2). Evidently copulation is effected by a right male at the left side of a left female, and by a left male at the right side of a right female, the anal (*p*) of the male being turned so as to bring its tip under the free edge of the foricula (*s*) into the mouth of the oviducts.



1



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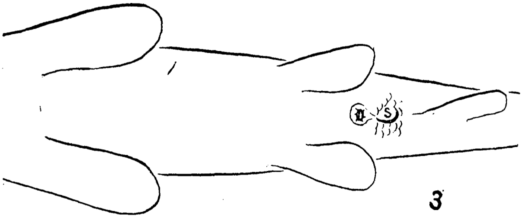

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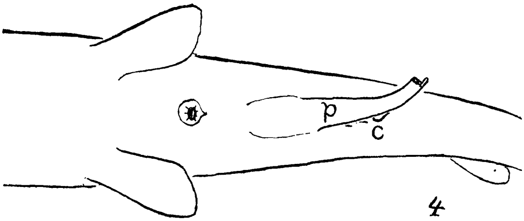

4

From the specimens examined it would appear, at sight, as if the male sex was eventually to become dextral and the female sinistral, and as if by selecting rights or lefts one might exclusively raise either rights or lefts as he chose; but the proportions of the sexes, and of dextral and of sinistral of each sex, in the progeny are really determined by tendencies in the ovary, tendencies which may vary from connection with different males, from food, temperature, etc. To bring about a variety in the species, all the males of which might be rights, or all lefts, the females to suit, choice would have to be made of individuals actually producing the required forms, and of particular conditions, in a measure disregarding the right or left of the parents. And this introduces a great many complications into the selection problem. Another question of interest relates to the origin and development of the unusual features. Some light is thrown upon this by an allied genus in the family, of which the males alone appear to be rights and lefts. Excepting these genera, no other creatures are recalled that are in the particulars under notice similar to these peculiar fishes. Though less extravagant, the species of Anableps are suggestive of the fanciful birds in the stanza translated by Moore, as he tells us, from the Persian, alluding to the " Jaftak," " a sort of bird that is said to have but one wing, on the opposite side to which the male has a hook, and the female a ring, so that when they fly they are fastened together: "

" How can we live so far apart ?
Oh, why not rather heart to heart,
United live and die,
Like those sweet birds that fly together,
With feather always touching feather,
Linked by a hook and eye ! "

—S. Garman.

The Bats of Cuba.—Of the twenty species of bats observed by Dr. Gundlach in Cuba, nineteen have been recorded by him in his paper entitled "Contribucian á la Mamalogia Cubana." He places them in two groups, as follows: I. Species with a nose-leaf or with fleshy wrinkles over the nostrils or around the mouth. They hang themselves during the day by the hind legs. They eat insects and fruit. The following genera are included: Macrotus, Monophyllus, Phyllonycteris, Artibeus, Phyllops, Brachyphylla, Mormops, Chilonycteris, Noctilio. II. Species without a nose-leaf and with no wrinkles about the mouth. These sleep in crevices and do not hang themselves by the hind feet. They eat only insects. The following genera are included: Molossus, Nyctinomus, Natalus, Vesperus, Nycticejus, Atalapha. (Abstr. Proceeds. Linn. Soc. New York, No. 7, 1895.)

Fatigue and Toxicity.—A series of experiments carried on by M. Redon show the toxicity of the blood of cattle that have died of fatigue. The arrival at the abattoir (Paris) of a consignment of cattle from South America gave opportunity for the experiments. Five individuals died after a panic stricken race. The autopsy revealed that the animals had suffered from both hunger and thirst during the long journey. Of three rabbits inoculated with the serum of the dead cattle the first, injected with a dose of 12 cubic centimeters, died in five hours; the second, inoculated with 5 cubic centimeters, was seized with a violent diarrhœa, which terminated its life at the end of the fifth day, having lost one-third of its weight; the third, having received one cubic centimeter of serum, died in 30 hours. In the first and third case the liver was very much congested and enlarged.

Although the intravenous injections differ from the accustomed mode of ingestion of food, M. Redon thinks it highly probable that the eating of the flesh of animals that have died from fatigue is detrimental to health. Acting on this presumption, the veterinary inspectors promptly quarantined all the animals of the consignment that showed signs of the fever of fatigue. (Revue Scientifique, June, 1895.)

Poisons of Putrid Fish.—In a short article, incorporated in the Bull. U. S. Fish Commission recently issued, Dr. J. Lawrence Hamilton points out the connection between foul fish and filth diseases. Beginning with cholera, he notes the outbreak of this disease in 1893, in the fishing ports of Grimsby and Hull, and instances cases of deaths which occurred from mussels, cockles and oysters from those infected ports.

It is well known that fishing populations, from their slovenly and dirty habits, are more prone to endemic as well as epidemic affections. The author refers to Astrakan, the seat of the sturgeon and caviare industries, as a case in point. Statistics show that the population of this place would become extinct were it not recruited from external sources. During the winter of 1878–79, the plague devasted the place, and the worst and most fatal cases were among the laborers employed in fish salting, who live under very miserable conditions. The price of bread being beyond their reach, they subsist chiefly on the leavings of the inferior parts of the prepared fish. Formerly, Government rules enforced that the unused remains of the prepared fish should be thrown directly into the the water, but now these, collected and accumulated in masses, are left to rot in and about the banks of the rivers under the heat of sometimes an almost tropical sun. The local atmosphere is further vitiated by many fat-boiling, fish-oil, isinglass, etc., works. During the five years preceding the outbreak of plague in 1878, enteric fevers, measles and small-pox were epidemic, whilst scarlet fever raged in 1876–77. Previous to 1878, the town of Astrakan, during 22 years, had suffered from nine epidemic attacks of cholera and three of enteric fever.

Such skin diseases as elephantiasis, ichthyosis, and beri-beri are suspected of being produced by a combination of fish, filth and poverty.

Wounds caused by the handling of decomposed fish are often very serious. The author gives a list of such cases. The Norwegian whalers take advantage of this fact by using prepared putrefactive poisoned harpoons. The whales are driven toward shore, surrounded by a net to prevent escape, and then struck with the poisoned harpoons. After twenty-four hours they show signs of exhaustion, probably through septic poisoning, and are readily captured. The harpoons are recovered and carefully preserved, without wiping, for future use.

The importance of the question of putrid food cannot be overestimated, hence the author's strong language in urging a better supervision of the fish-markets. Especially does he condemn the practices of leaving fish ungutted and unbled until sold, and of keeping fish soaked and sodden with water to make the skin look bright.

The foul condition of the boats, and of the boxes in which the fish are shipped to market, and the unsanitary condition of Billingsgate Market, are described in disgusting detail, and suggestions are given for, at least, mitigating these evils.

The infection of fish by impure preservatives, such as ice made from impure water and dirty salt and also bacterial infection, are referred to. In this connection the author remarks that "the cleanliness in the United States caviare factories is unknown in southern Russia, the home of astounding dirt and disease, augmented by the most hideous poverty and ignorance."

It has been supposed that prolonged soaking would render diseased animal food innocuous, but it would seem, from the experiments conducted by Prof. Pamem and again by Dr. Bremton that the vitality of poisons derived from putrid and other animal matter, though weakened, is not destroyed by boiling. Accordingly, to avoid all possible danger of the use of condemned food, the author recommends that it be burnt in properly-constructed local furnaces, and he includes, under this head, particularly "fish, its offal and refuse."

Another important suggestion as to public welfare is for all fish to be bled, gutted, cleaned, and dry-air-frozen at the place of capture. This would do away with many of the evils complained of, and is, moreover, a feasible business project. The author's investigations on this point warrant him in stating that "every day in the year, 2 pounds of bled, gutted, cleaned, dry-air-frozen (imperishable) fresh herring (about 6 fish) could be profitably retailed by costermongers for one penny, or 2 pounds of sprats for one halfpenny."

A sharp arraignment of the "Billingsgate Ring," which Dr. Hamilton accuses of diminishing the market supply of fish, in order to keep up the price, by getting the fish destroyed at various places along the coast, and a brief description of the "koshering" process for preserving animal food, closes this interesting paper.

The idea embodied in the article is, that foul fish is one of the most unwholesome, disease-producing factors in existence, but the conditions that result in such food being put upon the market are not necessary, but are due to ignorance, carelessness and greed, and can be remedied at no great expense. (Bull. U. S. Fish Commission, Vol. XIII, pp. 311–334).

ENTOMOLOGY.[1]

The Genera of Lysiopetalidæ.—The genus Spirostrephon was founded by Brandt on *Iulus lactarius* Say, in 1840. Owing to the fact that many subsequent naturalists have not had an equally vivid appreciation of generic characters and limits, Spirostrephon has usually appeared as a synonym of Lysiopetalum, the typical species of which is *L. fœtidissimum* (Savi).

Through the kindness of Mr. Pocock of the British Museum I have had the opportunity of comparing specimens of *fœtidissimum* with abundant material of *lactarium* from Pennsylvania, Ohio, and the District of Columbia. The form, and ornamentation of the body and the location of the repugnatorial pores render the generic distinctness evident, as Brandt pointed out. Brandt also remarks[2] the similarity with Cambala, but holds the genera distinct because the ocelli of Cambala are represented as arranged in a single row. There seems to be no ground for Latzel's inference that Brandt included Cambala under Spirostrephon.[3] Brandt saw but one specimen, which must have been young, as the length and number of segments are less than in mature specimens of *lactarium.*

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[1] Edited by Clarence M. Weed, New Hampshire College, Durham, N. H.

[2] Recueil, p. 90.

[3] Myr. Ost. Ung. Mon., II, p. 353.